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BATTERY CHARGER NOTABLY FOR A PORTABLE TELEPHONE

The invention relates to a battery charger, notably for a portable telephone.

A certain number of units in current use, such as portable telephones, are powered by batteries which have to be 5 recharged at regular intervals. The different types of units are equipped with batteries with very diverse features, notably for the charge parameters which are the charge voltage and the charge current as well as for the geometry of the link connector. For example, portable telephone models are 10 numerous and generally comprise batteries, with connector and charge parameter characteristics differing from one model to another.

The charge parameters and the connector geometry thus characterize a battery charger forming a set adapted to each 15 unit model, this leads to the existence of many types of chargers. The rapid development of unit models leads to the purchase of a battery charger for each new model. This situation causes unnecessary expenses.

Adjustable battery chargers which may deliver different 20 charge voltage and/or current values are already known. However, they need to be adjusted by the user which is an obstacle to their use on the one hand, and on the other hand, the connector is connected to the charger via a cable which in practice cannot be removed from the unit, this cable ending 25 with a connector which also cannot be removed from the cable.

Thus, in spite of the possibility of changing the electric charge parameters, the devices are only adapted to a single type of unit, or to a limited number of unit types.

The invention finds a remedy for this drawback by making 30 available to the user of battery units, an easy-to-use charger which may be used for several types of units.

The invention consists of providing a charger, with variable charge parameters and of fitting this charger with an

element for connecting to the unit, this element being removable from the charger and of providing a means outside the charger, for automatic determination of the electrical parameters of the charge upon connecting the unit to the 5 charger via the connection element.

In a preferred embodiment, the means for automatic determination of the charge parameters is integral with the connection element.

Alternatively, this determination means is located in the 10 battery unit.

Thus, a user or a distributor of chargers may have only one charger (or type of charger) and a plurality of connection elements, each of the latter being adapted to a unit model.

In an embodiment, the connection element includes a first 15 connector for cooperating with a complementary connector of the unit and extended with a cable ending with a second connector for connecting to the charger.

In this case, if the means which automatically determines the charger parameters is located in the connection element, 20 this means may be installed in the cable and/or in the first and/or second connector.

In one embodiment, the means for automatic determination of parameters includes at least one electronic component such as a resistor or one connection such as a simple connection 25 wire, which, upon connecting the unit to the charger, forms a component (element) of a circuit of the charger determining the charge parameter(s).

Alternatively, the component(s) or the element (or the elements) such as resistors, is (are) physically contained in 30 the battery unit and the electrical connection cable connecting the unit to the battery charger includes at least one conductor per element (or item) in addition to the conductors for the charge.

The invention therefore relates to a battery charger 35 comprising an element for connecting to the unit, the battery of which is to be charged, which is characterized in that its charge parameters are variable, in that the connection element

is removable from the charger, and in that it comprises a means, outside the charger, providing automatic determination of the electrical parameter(s) of the charge upon connecting the unit to the charger via the connection element.

5 The means for automatic determination of the charge parameter(s) is for example located in the connection element.

This means includes, in one embodiment, at least one electronic component such as a resistor.

10 According to one embodiment, the means for determination of the charge parameter(s) is located in the connector of the connection element which is for cooperating with a complementary connector of the charger.

15 The means for automatic determination of the charge parameter(s) may also be located in the cable of the connection element or in a connector for cooperating with a complementary connector of the unit to be charged.

20 The invention also relates to a battery charger which is characterized in that it includes means for varying the charge parameters and in that it includes at least one input for receiving an element or signal for determining these parameters.

25 For example, the input for receiving a signal which determines the parameter(s) of the charge, forms an input of a connector for cooperating with a complementary connector of an element for connecting to the unit to be charged.

30 The invention also relates to a connection element for connecting a battery charger to a battery unit, which is characterized in that, as it is removable from the charger, it includes at least one component for determining, in the charger, the charge parameter(s) of the battery unit to which it is intended to be connected.

35 In this connection element, the means for determining the charge parameter(s) includes, according to one embodiment, at least one electronic component such as a resistor, the terminals of which are to be connected to the charger via the connector of this connection element.

The invention also relates to a battery unit which may be connected to a battery charger through a connector which is characterized in that it comprises a means for automatically determining the electrical parameters of the charge generated 5 by the charger upon connecting the unit to the charger via the connector.

This battery unit, for example contains, one (or several) electronic component(s) such as a resistor or a connection, connected to a pair of terminals and which thus by connection 10 belongs to the electrical circuit of the battery charger and determine(s) the charge parameters of the charger.

Other features and advantages of the invention will become apparent with the description of certain of its 15 embodiments, the latter being made with reference to the appended drawings wherein:

Figure 1 is a schematic view of the set, according to the invention, of a battery charger and a battery unit connected through a connection cable,

Figure 2 is a schematic view of the set, according to the 20 invention, of a battery charger and of a cable connector on the charger side.

A battery charger is functionally formed by an electronic circuit, connected at the input with the mains or a battery of max. 48 volts, which delivers to a unit with a battery to be 25 recharged, generally via a connection cable, charge parameters, such as voltage and current, the latter being determined by the value of the components of the circuit.

In the example, these components for adjustment are positioned in a removable element such as the connection cable 30 provided with two connectors, each of these components is connected to a pair of terminals of the connector, preferably on the charger side, and inside the charger each pair of terminals is connected at the position provided for the component in the circuit diagram.

Thus, the charger may be used for charging miscellaneous 35 units, the cable being specific to each unit.

The battery charger 2, illustrated in Figure 1, has a connector with two input terminals 4, adapted for the mains. The battery charger 2 is connected to the unit 6, the battery of which is to be charged, through a cable 8 including a plurality of conductors and ending on the charger side with a removable connector 10 for cooperating with a complementary connector (not shown) fixed onto the charger. Cable 8 is fitted, on the battery unit side, with a second connector 12 for cooperating with a complementary connector (not shown) mounted on unit 6.

The battery charger 2 is illustrated in Figure 2 in a version adapted for the mains as a power source. It contains an electronic circuit illustrated as blocks, notably comprising a rectifier block 13 delivering DC voltage to a high frequency chopping circuit 14 which powers an isolating transformer 16, the output of which is connected to two terminals 18 and 20 of the output connector of the charger.

The charge parameters, current and voltage, delivered on terminals 18 and 20 are determined by a voltage reference signal 24 and by a current reference signal 26. The values of the reference signals depend on the values of resistors 28 and 30, respectively, located on connector 10 and connected to the electronic circuit of the battery charger through connection terminals 34, 36 and 38, 40. The reference signals of elements 24 and 26 are transmitted to the chopping circuit 14 through an optocoupler 22.

Thus, the connection of the connector 10 to the battery charger particularizes this charger and enables it to deliver on the output terminals 18 and 20, the charge parameters adapted to the battery unit.

In an alternative embodiment (not shown), the battery unit transmits a signal representing the charge parameters which are transmitted through the removable connection cable to the battery charger which therefore includes an input for receiving these signals and means for adapting the charge parameters to the received signal.